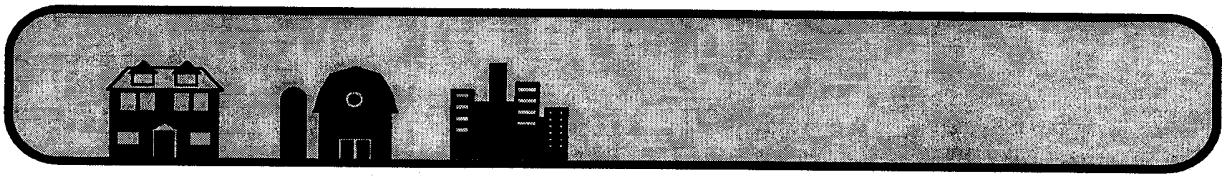
Red River Valley



Water Needs Assessment

Phase II;
Appraisal of Alternatives to Meet Projected Shortages

Addendum: Responses to Comments on the Draft Report

August 2000

United States Department of the Interior
Bureau of Reclamation

Letters of Comment

Red River Valley Water Needs Assessment Phase II

Letter No.	Author
1	City of Grand Forks
2	Dr. Gary Pearson
3	North Dakota Game and Fish Department
4	North Dakota State Water Commission
5	Moorhead Public Service
6	Minnesota Department of Natural Resources
7	Canadian Section of the Garrison Joint Technical Committee
8	U.S. Army Corps of Engineers
9	U.S. Fish and Wildlife Service

KENNETH A. VEIN, P.E.

City of Grand Forks

255 North 4th Street • P.O. Box 5200 • Grand Forks, ND 58206-5200

(701) 746-2630
Fax (701) 746-2514

March 27, 2000

Greg Hiemenz
Bureau of Reclamation
Dakotas Area Office
P. O. Box 1017
Bismarck, ND 58502

Re: Red River Valley Water Needs Assessment Phase II;
Appraisal of Alternatives to Meet Projected Shortages - Draft Report

Dear Mr. Hiemenz:

The City of Grand Forks appreciates the opportunity to work with you on the development of the above referenced report intended to address the water needs of the Red River Valley for a 50-year planning period. Through Hazel Fetters-Sletten's and Steve Burian's participation on the technical steering committee, we have had significant opportunity to provide input at various stages of the report development.

The City of Grand Forks is very interested in long term water management and planning as part of our drought contingency plan. The Phase I study concluded and the Phase II study builds on the determination that the City of Grand Forks will have no difficulties meeting our water needs for the 50-year time period studied. In consideration of this conclusion, I would like to offer the following cautions and comments:

1.1 1. The model indicates that the influence of Fargo's return flows decreases the potential shortages in the Grand Forks area. In the future, water reuse programs may minimize return flows as a reliable water supply for the Grand Forks area.

1.2 2. The assumption that Grand Forks would utilize its entire allocation from the Red Lake River prior to placing a demand on the Red River water supply is also of concern. This assumption may not be acceptable given the fact that the Red Lake River watershed was not modeled to determine if an adequate water supply existed to simultaneously meet the needs of the City of East Grand Forks and the appropriation for Grand Forks under drought conditions. Furthermore, the differences in water law between Minnesota (Riparian Water Law) and North Dakota (Western Water Law) may affect the validity of the Bureau assumption.

1.3 3. One phase of a previous study done by the US Army Corps of Engineers in the early 1980's shows a water supply shortfall in the Grand Forks area. Although both studies have merit they do illustrate the point that

1.1 Your comment is noted. Future modeling could simulate varying amounts of water reuse in Fargo to estimate effects on downstream shortages.

1.2 More detailed modeling of Red Lake River flows and the operation of Red Lake dam are needed. Shortages could occur at Grand Forks during a severe drought if the amount of water available from the Red Lake River was less than the amount estimated for this study.

1.3 Your comment is noted.

each model is based on assumptions which may or may not prove to be true.

4. We have consistently maintained that the water quality of the Red River is a significant concern in addition to the quantity. Continued emphasis on water quality considerations is important as the study moves into the Feasibility Study phase.

5. We are pleased to see that the study group acknowledges that the number of stakeholders for various options may not include the entire study area. Each community will need to assess the cost to benefit ratio for each option and determine their willingness to pay.

Thanks again for the opportunity to participate in and provide comment on this important series of studies for our region. If you have any questions regarding our comments, please contact Hazel Fetters-Sletten at (701)746-2595.

Sincerely,

Kenneth A. Vein, P.E.
City Engineer/PWD

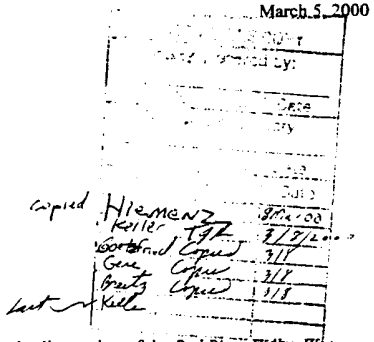
c: Hazel Fetters-Sletten
Steve L. Burian, P.E.

1.4 Your comment is noted.

1.5 Your comment is noted.

GARY L. PEARSON, D.V.M.
1305 Business Loop East
Jamestown, North Dakota 58401
Telephone (701) 252-6036
Facsimile (701) 251-6160
E-mail: gpearson@daktel.com

March 5, 2000



Mr. Greg Hiemenz
U. S. Bureau of Reclamation
Dakotas Area Office
P.O. Box 1017
Bismarck, North Dakota 58502

Dear Greg:

I have not had an opportunity to go make a line-by-line review of the *Red River Valley Water Needs Assessment Phase II Appraisal of Alternatives to Meet Projected Shortages Draft Report*, but I would like to offer the following comments dealing primarily with several conceptual aspects of the report.

2.1

Projected Shortages

The first finding on Page S-1 of the EXECUTIVE SUMMARY states that:

> "Significant shortages exist under either Reclamation's or the Participants' year-2050 projections, even without consideration of instream flow requirements."

However, this statement fails to reflect the fundamental conclusion upon which the entire alternatives appraisal is based, which is that, under either Reclamation's or the Participants' projections, significant MR&I shortages will occur in the Red River Valley **only if** another drought of the severity and duration of the 1930s (1932-1940) occurs at the year-2050 demand projections. If it were not for the possibility of the occurrence of another 1930s-style drought, it is not likely that the Phase II alternatives analysis would even have been undertaken.

It is not until Page S-6 of the EXECUTIVE SUMMARY that the reader learns that:

> "Based upon the projected year 2050 demands shown above, significant shortages available for municipal and industrial users would occur during periods of drought."

But even this does inform the reader that, in order for those significant shortages to occur, the drought would have to be of the duration and severity of the 1930s. As it is written, the reader is left to believe that any drought period—even one such as 1976-1977—would result in "significant shortages available for municipal and industrial users" at year-2050 demands.

2.1 Reclamation agrees that projected shortages would not be chronic, but rather would only occur during periods of severe drought. During most years, flows in the Sheyenne River and Red River would be sufficient to meet all surface water demands. Our modeling indicates that the duration of a drought is less critical than its magnitude, since the greatest annual projected shortage occurred in 1934, less than half way through the 1930's drought period.

It should also be noted that a shortage was projected only when there was zero flow available to meet a demand. No consideration was given to maintaining any minimum flow in the Sheyenne River or the Red River. Any provision for maintaining minimum instream flows would increase the frequency and magnitude of projected shortages.

Additional work is also needed in projecting industrial demands, since the size, type, number, and location of future industries can all affect overall projected shortages.

Figure S.2 at Page S-9 finally shows that significant shortages would occur at year-2050 demand projections only during drought periods of the duration and severity of the 1930s, but nowhere in the text of the EXECUTIVE SUMARY is the reader actually told this.

On Page S-18, the reader is told in the ALERNATIVES EVALUATION section of the EXECUTIVE SUMMARY that:

> "The evaluation rating considers only the expected impacts during a 1930s-style drought."

But s/he still is not told that this is because that is the only period during which significant shortages would occur.

In the FINDINGS AND CONCLUSIONS section of the EXECUTIVE SUMMARY on Page S-23, the reader is again told that:

> "If no action is taken to develop additional water supplies, the Red River Valley will experience significant shortages in the future during drought periods."

But s/he again is not told that significant shortages will be experienced in the future **only if** drought periods of the duration and severity of the 1930s occur at year-2050 demand projections.

It is not until the discussion of PHASE II RESULTS on Page 2-8 of CHAPTER 2—EXISTING AND PROJECTED MR&I DEMANDS that the reader finally is told—in the last sentence at the bottom of the page—that:

> "As the figure shows, the most sizable shortages, by far, occur during the drought of the 1930s."

The figure is "Figure 2.1—Red River Valley Reclamation Year-2050 Projections. Annual Shortages for All MR&I Demands, Based on Baseline Conditions," which is the same figure that is shown on Page S-9.

However, this concept is so critical and so fundamental to the entire alternatives analysis that it needs to be highlighted at the beginning of the EXECUTIVE SUMMARY and it needs to be re-emphasized everywhere that shortages are mentioned throughout the report—and not simply displayed in a couple figures and briefly mentioned in one sentence at the bottom of one page. To do less fails to provide the reader with an accurate and objective appraisal of future MR&I water needs in the Red River Valley.

In CHAPER 10—FINDINGS AND CONCLUSIONS, we again find on Page 10-1 the statements that:

> "If no action is taken to develop additional water supplies, the Red River Valley will experience significant shortages in the future during drought periods."

and:

> "Significant shortages exist under either Reclamation's or the Participants' year-2050 projections, even without consideration of instream flow requirements."

These statements also need to be modified to emphasize that the Red River Valley will experience significant shortages **only if** a drought of the duration and severity of the 1930s occurs in the future at year-2050 demand conditions.

2.2 **Irrigation Under the Dakota Water Resources Act**

On Page S-2, the reader is told that:

> "The DWRA would deauthorize nearly all of the irrigation originally authorized in the project. . ."

However, the DWRA of 1999 retains 57,900 acres of Federally authorized non-Indian irrigation development, which is equivalent to 23% of the 250,000 acres of irrigation originally authorized under the Garrison Diversion Unit in 1965, and it is equivalent to 51% of the 113,360 acres of non-Indian irrigation development currently authorized under the 1986 Garrison Diversion Unit Reformulation Act. Clearly, the DWRA would not "deauthorize nearly all of the irrigation originally authorized in the project . . . "

2.3 **Financial Analysis**

I remain very concerned that, as stated on Page 8-1 in CHAPTER 8—FINANCIAL ANALYSIS:

> "The overall analysis is based on provisions in the proposed Dakota Water Resources Act (DWRA) of 1999 as interpreted by Reclamation."

Although it is noted here that:

> "(Note – Under the current authorization for GDU, as much as $250 million of the supply works costs would be considered reimbursable; and the Red River Valley feature would be assigned about 75% of these costs or about $180 million. This would increase reimbursable costs for the GDU supply works by about $170 million or 7.623 million in annual costs for Alternatives 7A through 7D and Alternative 8.)"

these increased costs under the current authorization are not reflected, or even mentioned, in the discussions of Alternatives 7A through 7D and Alternative 8 on Pages 6-9 to 6-34 of CHAPTER 6 ALTERANTIVES CONSIDERED. However, in view of the improbability that the DWRA of 1999 will be enacted, at least it its present form, it appears highly questionable, and potentially misleading, to base the financial analysis of alternatives on such speculative legislation, rather than on the authorization currently in effect. At the very least, the discussion of Alternatives 7A through 7D and Alternative 8, as well as Tables 8.2 and A-14 through A-22, should display the reimbursable costs under BOTH the current authorization and the proposed DWRA.

2.4 **Biota Transfer**

On Page S-12 of the EXECUTIVE SUMMARY and on Page 4-1 of CHAPTER 4—PRETREATMENT: DISINFECTION FOR BIOTA TRANSFER CONTROL, the following statement appears:

> "To ensure compliance with the Boundary Waters Treaty of 1909, water from the Missouri River drainage basin, prior to delivery to the Red River drainage, must be

2.2 Reclamation agrees that this statement is misleading, since about half of the non-Indian irrigation acreage authorized in the 1986 GDU Reformulation Act remains with the Dakota Water Resources Act. Although 57,900 acres of non-Indian irrigation are authorized in the DWRA, the Act does not provide sufficient funding for development of new irrigation areas. Section 10 of DWRA reduces the cost ceiling available for irrigation development and certain other construction activities from $ 270,395,000 to $164,000,000. About $ 146,000,000 has been expended to date under this authorization. Thus, about $ 18,000,000 would remain if DWRA was enacted. Although this could be used to fund a small portion of the authorized irrigation, Reclamation believes that other activities funded under this authorization would have a higher priority, and essentially no money would be available for irrigation development. Authorized irrigation developed with non-Federal funding would, however, be eligible for federally subsidized power rates.

2.3 None of the alternatives described in the report could be constructed under the current authorization. Therefore, we believe that the financial analysis should be based on a common set of assumptions for all alternatives. It should also be noted that the reimbursable costs presented for the current authorization reflect to a large extent administration policy rather than strict requirements under the 1986 Act.

2.4 Your comment is noted. The report should have stated that <u>all</u> aquatic biota must be inactivated.

pretreated to inactivate aquatic biota, including fish, larvae, fish eggs, algae, viruses, bacteria, and protozoa."

It should be noted, however, that, in addition to the types of biota listed here, the International Joint Commission also identified a sturgeon metazoan parasite, *Polypodium* sp., as species of concern for introduction into Canadian waters from the Missouri River system.

2.5 **Partial Abandonment**

In both the FINDINGS AND CONCLUSIONS section of the EXECUTVE SUMMARY at Page S-23 and in the CONSIDERATIONS FOR FUTURE STUDIES section of CHAPTER 10—FINDINGS AND CONCLUSION at page 10-2, the following statement appears:

> "The costs associated with not utilizing portions of the existing Garrison Diversion Unit facilities were briefly studied and, in particular, the costs were estimated for minimal maintenance and for full abandonment. A partial abandonment was not analyzed and could have the potential for long term savings."

Presumably, the **ANNUAL OM&R COSTS, GDU Supply** shown in Tables A-4, 6, 8, 10,12, 14,16, 18, 20 and 22, reflect the estimated minimal maintenance costs for those features, but I am unable to find any further information explaining what full abandonment or partial abandonment even entail. I believe that it would be helpful to the reader to explain that full abandonment, according to the Bureau of Reclamation's definition, would involve complete restoration of all canals and other excavations to their former contours and removal or other disposition of all structures, and that partial abandonment might include a combination of minimal maintenance of some features, complete restoration of some, and return to private ownership of others. It also should also be noted that partial abandonment could have the potential for long term savings only **for those alternatives not utilizing existing features of the Garrison Diversion Unit.**

Whether the Technical Steering Team needs to schedule another meeting to review the comments received on the Draft Report would seem to depend largely upon the number and substance of the comments that are received. If the comments are primarily editorial or simply deal with the organization or presentation of the information, another meeting may not be warranted. However, if the comments deal with substantive issues which would materially change the information presented in the report, then another meeting to discuss those comments certainly would be in order.

Sincerely,

Gary

Gary L. Pearson, D.V.M.
National Wildlife Federation Representative
Technical Steering Team
Red River Valley Water Needs Assessment

fc: Mr. David Conrad, National Wildlife Federation, Washington, D. C.
Mr. Daniel P. Beard, National Audubon Society, Washington, D.C.
Ms. Genevieve Thompson, National Audubon Society, Fargo, North Dakota

2.5 More detailed analyses concerning abandonment of constructed facilities will be conducted for the feasibility study.

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NORTH DAKOTA GAME AND FISH DEPARTMENT
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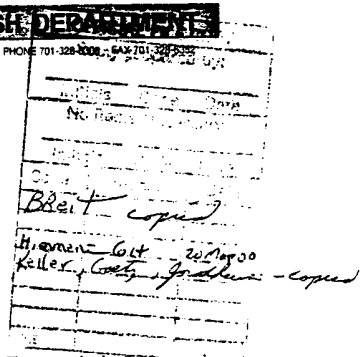

Mar. 16, 2000

Mr. Dennis E. Breitzman
Area Manager
Bureau of Reclamation
P.O. Box 1017
Bismarck, N.D. 58502

Dear Mr. Breitzman:

Re: The Draft Red River Valley Water Needs Assessment Phase II; Appraisal of Alternatives to Meet Projected Shortages

3.1 The Department has reviewed the aforementioned document and offers the following comments. In general we believe the report provides a comprehensive assessment of the potential alternatives with which to meet future water needs in the Red River Valley. It also appeared to provide a fairly accurate description of the environmental impacts based on the information which was provided.

3.2 We do question the assertion in the report which states "Implementing the seasonal instream flow regime for aquatic life and riparian corridor maintenance could cause minor, but not significant, impacts to the recreational use of the Sheyenne and Red Rivers." While the Department does not have specific information to refute this statement, we believe it is based on generalized study results/responses. Additional study may be needed prior to making such a broad and definitive statement. For example, adding water to the Red River near Wahpeton may provide substantial recreation related benefits during drought conditions.

Sincerely,

Michael G. McKenna
Chief
Conservation and Communication Division

3.1 Your comment is noted.

3.2 Reclamation agrees that additional studies are needed to accurately quantify positive and negative impacts associated with the alternatives.

North Dakota State Water Commission

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March 16, 2000

Greg Hiemenz
Bureau of Reclamation
Dakotas Area Office
P.O. Box 1017
Bismarck, ND 58502

Dear Greg:

We have completed a technical review of the *Red River Valley, Water Needs Assessment, Phase II, Appraisal of Alternatives to Meet Projected Shortages, Draft Report;* the *Phase I Part A and Phase II Hydrology Appendix;* and the *Phase II Engineering Appendix* and have the following comments.

Phase II, Appraisal of Alternatives to Meet Projected Shortages

4.1 Page S-1, Findings, First Bullet
The major finding is that there will be significant shortages, that statement does not need to be qualified in the executive summary with the statement "even without consideration of instream flow requirement." Instream flow is addressed properly in the second bullet.

4.2 Page S-4 and Page 2-2, Database and Modeling, Lake Ashtabula Storage Rights
The report states that water stored in Lake Ashtabula is apportioned among five downstream cities. The water has been appropriated to these cities, each of which holds a valid water right.

4.3 Page S-12, Legal and Institutional Analysis of State Water Law
The report states that appropriation can be used to protect instream flows. In North Dakota the appropriation of water for a minimum flow requires the construction of works to divert or store water.

4.4 Page S-15, Table S.7, Costs
Several of the Features note that the cost does not include biota treatment plant costs. An explanation of the reason these costs were not included should be added.

4.5 Page 5-13, Feature 8, Purchase Existing Groundwater Rights
In the *Effects on Projected Shortages* section of this feature it is stated, "For estimating purposes, it is assumed that about one-third of the landowners would be willing to sell for a price at least 150% of current market value." Then in the *Cost* section of this feature it states, "The cost estimates for this feature...are based on the purchase of all the acreage associated with each randomly selected water right for a net price of $1,000 per acre." This estimate is probably much lower than what would be expected by landowners, especially assuming 150% of current market values. Since Feature 8 focuses on land near the Sheyenne Delta, Page/Galesburg, and Elk Valley aquifers, estimates in excess of $1,500 may be

4.1 Your comment is noted.

4.2 Your comment is noted.

4.3 Your comment is noted. Although water cannot generally be appropriated for instream flows, values associated with instream flows (e.g., fish and wildlife, recreation) may be considered by the State Engineer in deciding whether to grant a new appropriation. Appendix K of the Phase 1, Part B, Instream Flow Needs Assessment dated August 1999 addresses this comment and North Dakota and Minnesota Water Law in greater detail.

4.4 The features listed in Table S.7 are individual water supply or demand components which were combined to develop alternatives to meet projected shortages. Total cost for each alternative, including biota treatment, are shown in Table S.8 and chapter 6.

4.5 Your comment is noted. Due to the number of unknowns associated with this feature, the water yield and cost estimate could change significantly with more detailed studies.

more realistic.

This section goes on to state, "Theoretically, the cost could be partially offset by revenues gained from leasing..." The net price is based on the assumption that the land has been sold, reducing the price by $500, if that is the case it is no longer available to be leased.

4.6 Page 5-15, Feature 9, Use Aquifers for Water Storage and Recovery
It is stated that this feature, like the previous two, is used only in alternative 4. However, the previous two alternatives state that they are used in alternatives 3 and 4.

4.7 Page 5-16, Feature 10, Desalinization of Water from the Dakota Aquifer
It is stated that this feature, like features 7, 8, and 9, is used only in alternative 4. This is not consistent with the statements for alternatives 7 and 8.

4.8 Page 5-19, Feature 13, Drought Contingencies
In the discussion of the minimum pool it should be noted that the Corps of Engineers does not hold a water permit for this use, but instead the water stored in Lake Ashtabula is appropriated to five cities and they hold the water rights.

4.9 Page 5-20, Feature 13A, Eliminate Minimum Pool of Lake Ashtabula
In the *Cost* section of this feature it states, "... would result in a periodic complete loss of the Lake Ashtabula fishery and all associated recreational activities. The estimated cost for restocking the fishery is about $2 million, but the loss of recreation-related spending at local businesses is estimated at more than $35 million."

It should be specified whether the $2 million required for restocking the fishery is for each of the periodic losses, or it that value represents the estimated total over the course of the periodic losses. This also applies to the recreation related losses. The number of years of recreation losses used as a basis to account for the estimated losses should be stated.

Also, it is unclear why these recreation losses are considered while the business losses that would result from purchasing irrigation water rights are completely ignored.

4.10 Page 5-34, Feature 18, Bismarck-Fargo Pipeline
It is assumed that water supplied to Fargo would be available to Moorhead, if this is the case it should be able to meet Moorhead's shortage. It is also unclear why Drayton would still have a shortage.

4.11 Page 6-7, Alternative 3, In Basin Enlarged Lake Ashtabula
The map does not show the ring dike on the lower Sheyenne River referred to in Feature 5.

4.12 Page 7-2 , Critical Criteria, Interbasin Biota Transfer
The sentence "Transfer of any flora or fauna from one basin to the other could cause serious ecological damage and would most likely violate the Boundary Waters Treaty of 1909" would be more correct if it was changed to, "Transfer of some flora or fauna from one basin to the other may cause serious ecological damage and could result in claims that the Boundary Waters Treaty of 1909 was violated."

4.6 The reference to features 7 and 8 should be omitted. Feature 9 was used only in alternative 4.

4.7 The reference to features 7 and 8 should be omitted. Features 9 and 10 were used only in alternative 4.

4.8 Your comment is noted.

4.9 The estimated costs associated with the loss of the Lake Ashtabula fishery would be incurred for each periodic loss. On page 5-24, the report states incorrectly that Feature 13A (elimination of the minimum pool at Lake Ashtabula) is included in Alternative 3. This feature is not included in any alternative, but rather is reserved for a drought more severe than the 1930's. Reclamation agrees that there could be business losses associated with purchase of irrigation water rights. Those losses were not estimated for this appraisal level study.

4.10 No connection between the Fargo and Moorhead water systems was modeled for Feature 18. Therefore, since Moorhead's intake on the Red River is upstream of Fargo's, projected shortages at Moorhead are unchanged. Drayton shows shortages under this feature because it has no storage allocation in Lake Ashtabula. Alternative 5, which includes Feature 18, eliminates all shortages at Moorhead and Drayton.

4.11 The ring dike on the lower Sheyenne River was inadvertently omitted from Figure 6.2.

4.12 Your comment is noted.

Hydrology Appendix

4.13 Page 13, Table 3, Explanation 1
The statement "Drayton has a water right senior and junior ..." does not make sense.

4.13 The statement should read "Drayton has water rights senior to both Fargo and Grand Forks, but does not have a Lake Ashtabula storage allocation."

4.14 Page 14, f. Improvement of the Lake Ashtabula Thomas-Acker Plan Shortage Distribution
A November 27, 1992, memo is referred to. It is stated that the memo is from the Director of the Hydrology Division to a Water Resource Engineer and that a copy of the memo is located in Attachment f. As the memo is not provided in the attachment, a copy is enclosed with this letter. As can be seen, the memo is from a Water Resource Engineer to the Director of the Hydrology Division.

4.14 Your correction is noted.

4.15 Page 20
The last paragraph states, "The State of North Dakota does not recognize this minimum storage pool according to the Thomas-Acker Plan." This sentence should be rewritten as, "The State of North Dakota does not recognize this minimum storage pool as the Corps does not have a water right for this dam and a portion of that pool has been appropriated by downstream cities."

4.15 Your comment is noted.

4.16 Page 44, third bullet
Same comment as on Page 13, Table 3.

4.16 The statement should read "Drayton has water rights senior to both Fargo and Grand Forks, but does not have a Lake Ashtabula storage allocation."

4.17 Page 55, Run R30K94 Results
The second paragraph of this section states, "*These irrigation shortages should be viewed with caution. They are representative of an attempt to meet full water right crop production each year.* In reality, during dry years, irrigators with junior water rights may be forced to limit their irrigation levels to fewer acres. ... The irrigation portion of this study merely demonstrates a worse case situation with maximum acreage under cultivation." This paragraph is repeated in many of the other run results. It appears to imply that the limiting of a junior water right is somehow not a shortage. There is no question if a junior water right holder is not allowed to exercise his right to water, there is a water shortage. Also, the word "cultivation" should be changed to irrigation.

4.17 Your comment is noted.

4.18 Page 56, Table 20 Note 2
The Thomas-Acker Plan includes only the cities of Fargo, West Fargo, Grand Forks, Valley City, and Lisbon. Tables 20, 24, 28, etc. still incorrectly include East Grand Forks.

4.18 Your correction is noted. This correction applies to Tables 20, 24, 28, 32, 36, 40, 44, 49, 53, 59, 65, 70, 74, 78, 82, 88, 92, 96, 101, 105, 109, 113, 117, 121, 125, 129, 133, 137, 141, 145, and 149.

4.19 Page 85, Run RKIN50E Description
In the sentence, "Both reservoirs were at minimum conservation capacity...at the start of the scenario to simulate wet conditions prior to the 1930s drought" the word "wet" should be "dry".
The same applies to Run RMAP50E on page 98.

4.19 Your correction is noted. The word "wet" should be "dry" in both instances.

4.20 Page 112, Run RIRR50C Results
The sentence, "Irrigation shortages did not occur in this simulation because all junior water right holders water rights were "purchased" as part of this feature." should be changed to "Irrigation shortages did not occur in this simulation because all irrigation water rights were purchased as part of this feature."

4.20 Your comment is noted.

4.21 Page 126, Run RRUC50C Results and Page 130, Run RCON50 Results
Both of these results mention Lake Kindred which is not included in the description as part of this feature.

4.21 Your correction is noted. On page 126, second paragraph and page 130, sixth paragraph, the sentence "Lake Kindred was not used to meet irrigation demand" should be deleted.

4.22 | Attachment I
Southwest Fargo should be West Fargo

4.23 | Attachment J, Page 3, Industrial Use
The citation of U. S. Geological Survey Circular ???? should be corrected.

4.24 | Attachment J, Page 8
The statement "**(Help Tom: what if anything do we want to say here about how this will be modeled?)**" should be removed.

Engineering Appendix

4.25 | Page 101+, Feature 1: Additional In-Basin Storage - Enlargement of Lake Ashtabula
This feature may require some modification as a result of the recent approval of the Baldhill Dam pool raise.

4.26 | Page 193, Feature 8: Purchase Existing Ground Water Rights, Description
It is stated the irrigation water right may need to be "abandoned", abandoning the water right would result in loss of the priority date and the new permit being junior to all other existing permits. This should be avoided if possible.

Sincerely,

David A. Sprynczynatyk
State Engineer

DAS:BE:cg/325

4.22 Your correction is noted.

4.23 The citation should read "U. S. Geological Survey Circular 1200, Estimated Use of Water in the United States in 1995."

4.24 Your correction is noted. Preliminary descriptions of features 12 and 13 were inadvertently included in the Hydrology Appendix. The final descriptions are included in the Engineering Appendix, pages 258 through 276.

4.25 Your comment is noted.

4.26 Your comment is noted.

MOORHEAD
PUBLIC SERVICE
500 CENTER AVENUE, BOX 779, MOORHEAD, MINNESOTA 56561-0779
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March 17, 2000

Mr. Greg Hiemenz
Bureau of Reclamation
Dakotas Area Office
P. O. Box 1017
Bismarck, ND 58502

Dear Greg:

Thank you for the opportunity to review and comment on *Phase II; Appraisal of Alternatives to Meet Projected Shortages, Draft Report* of the Red River Valley Water Needs Assessment. I also appreciate the opportunity to work with you and the Bureau staff on this project. I want to thank you for allowing me to have input throughout the project through the Technical Steering Team.

I have enclosed comments on the *Phase II; Appraisal of Alternatives to Meet Projected Shortages, Draft Report* of the Red River Valley Water Needs Assessment.

Sincerely,

Clifford McLain, PE
Water Division Manager

CM/cag
enclosures

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Comments on *Phase II; Appraisal of Alternatives to Meet Projected Shortages* of the Red River Valley Water Needs Assessment

5.1 **Pages 1-4:**
The section, **Background on Garrison Diversion Unit,** seems out of place. There should be an introduction as to how the Garrison Diversion unit ties into the MR&I water supply study and the role it played in initiating the study.

5.2 **Pages 2-4, Table 2.2:**
The total water demands for participants were calculated within this table. The ground water usage for Moorhead and West Fargo was added to the calculated total demands instead of being subtracted from them to get to the surface water demands.

5.3 **Chapter 5. Features:**
The text for many of the features states that the features do not reduce Moorhead's water shortages because of no present access to the MR&I water. While Chapter 6 acknowledges that the combined features in the alternatives meet Moorhead's water shortages without moving the water through the Red River from Wahpeton.

The **Model Assumptions** section of **Chapter 5** states that Fargo's Sheyenne pipeline does come within 1,500 feet of Moorhead's raw water line on the Red River. The text for the features that use the Sheyenne River for conveyance of the MR&I water state that the City of Moorhead's shortages are not met by these features because it does not have an intake on the Sheyenne River at this time. The potential for a connection to Fargo's Sheyenne River pipeline or a new, shared pipeline to Moorhead's raw water pumping station is very feasible and a solution to that issue.

Feature 18 is a 180-mile pipeline to Fargo's water plant. The text for this feature states that Moorhead continues to have shortages. The 180-mile pipeline built to Fargo's water plant can be extended an additional 1,500 feet to connect the MR&I pipeline to Moorhead's existing raw water pumping station and pipeline on the Red River or to Moorhead's water treatment plant.

5.4 **Financial Analysis:**
The financial analysis makes many assumptions. The actual number of public water suppliers that will participate in the project is not known. This is acknowledged in the report and will have an impact on the final costs to participants. During our discussions about reimbursable costs, there was some disagreement between the participants and Reclamation staff over federal obligations for distribution and treatment costs that will have an impact on participant's costs.

5.1 Your comment is noted. The Garrison Diversion Reformulation Act of 1986 authorized the delivery of 100 cubic feet per second of Missouri River water to eastern North Dakota. This aspect of GDU remains controversial, and has not been constructed. This needs assessment was initiated to determine if water shortages can be expected to occur in the future, and , if so, whether importation of Missouri River water is necessary to meet those shortages.

5.2 Your correction is noted. Surface water demands for Moorhead and West Fargo were calculated incorrectly in Table 2.2, and these incorrect demands were used in the HYDROSS model simulations. The error is systematic throughout the study and only accounts for a small amount of the total supply in the basin. The general effect of this error is that all action alternatives are sized 3 to 4 cfs too high. Given the lack of detail on other input variables used in the model (North Dakota tributary flows, flows and demands on the entire Minnesota side of the basin, projected demands for new industries, and operations of Orwell Reservoir, Upper and Lower Red Lake, and Lake Traverse), the error is not significant. A corrected version of table is provided on the next page.

5.3 Your comment is noted. Model runs for the features described in chapter 5 do not assume a connection between Fargo and Moorhead water supplies. Therefore, since Moorhead's intake is upstream of Fargo's, many of the features appear to have no effect on Moorhead shortages. As you point out, these shortages can be alleviated with a 1500-foot pipeline between Fargo and Moorhead. Model runs for the alternatives described in chapter 6 do assume a connection between Fargo and Moorhead water supplies, and meet all of the projected shortages in Moorhead.

5.4 Your comment is noted.

Table 2.2.—Red River Valley Water Needs Assessment
Future Condition (2050) Population and Municipal and Industrial Water Use: Reclamation Projections

Municipality	2050 population	Raw water demands									Groundwater demands		Total surface water demands	
		Residential, commercial, and public use		Industrial use		Total commercial, public, and industrial demand		Loss rate (%)	Total raw-water demands					
		gpc/d	acre-feet	gpc/d	acre-feet	gpc/d	acre-feet		gpc/d	acre-feet	gpc/d	acre-feet	gpc/d	acre-feet
Fargo[1]	192,600	131	28,262	9	[1] 1,942	140	30,204	[2] 17.5	170	36,610	0	0	170	36,610
West Fargo[4, 16]	33,300	120	4,476	18	[14] 657	138	5,133	[3] 10.0	153	5,703	76	[11] 2,823	77	2,880
Moorhead, MN[4, 10, 17]	42,600	120	5,726	48	[14] 2,300	168	8,026	[3] 10.0	187	8,918	14	[11] 662	173	8,256
Valley City[5]	6,570	105	773	49	[14] 357	154	1,130	[3] 10.0	171	1,255	0	0	171	1,255
Grand Forks[6]	93,200	100	10,440	93	[14] 9,740	193	20,180	[3] 15.0	227	23,741	0	0	227	23,741
East Grand Forks[7]	8,700	120	1,169	21	[14] 200	141	1,369	[3] 20.0	176	1,712	0	0	176	1,712
Grafton[8]	5,100	120	686	76	[14] 432	196	1,118	[3] 10.0	217	1,242	0	0	217	1,242
Drayton[9]	900	120	121	519	[15] 523	639	644	[3] 15.0	752	758	0	0	752	758
Wahpeton	9,200	110	1,128	0	0	110	1,128	[3] 20.0	137	1,410	137	[11] 1,410	0	0
Breckenridge, MN	3,700	112	464	0	0	112	464	[3] 20.0	140	580	140	[11] 580	0	0
Existing Cargill[12]	—	—	—	—	6,000	—	6,000	—	—	6,000	—	0	—	6,000
Future industries[12, 13]	—	—	—	—	24,000	—	24,000	—	—	24,000	—	0	—	24,000
Total	395,870		53,245		46,151		99,396			111,929		5,475		106,454

[1] Detailed sector use was not available from the city. Early in this study, the 2040 level of use was used for future conditions. This 2040 demand was extended to the year 2050 by using the same 2040 commercial, residential and public use rate modified by population. Industrial growth was extended to 2050 by maintaining the same percentage of total use as in the 2040 projections. Additional industrial growth was also considered for the city in the form of a Cargill-type plant. This plant (future industry 2) was placed within 10 miles of the city on its own water supply and water right; it is not included in the Fargo demand estimate above. Also refer to notes 12 and 13 regarding future industries.

[2] Fargo's loss was estimated at 17.5 percent, which represents the 1990-94 average.

[3] Use rates versus projected raw water demand are based on the 1994 estimate of system losses rounded to a percent loss rate (high, 20 percent; medium, 15 percent; or low, 10 percent) of the surface water diversion. The difference between the billed amount and the diversion amount allows for treatment plant operations such as filter backwashing, and other miscellaneous losses.

[4] The use rate for future conditions was set at 120 gpc/d for commercial, domestic and public use. This was based on a combination of Reclamation Planning Instruction 82-01 dated 1/15/82, and projected use rates for other cities (e.g., 119 gpc/d for Winnipeg, Manitoba).

[5] The current use rate provided by Valley City was 104 gpc/d for 1994. Reclamation adjusted this amount to 105 gpc/d for commercial and public use based on Planning Instruction 82-01.

[6] The level of demand for 2040 was based on the draft report "50 Year Water Quantity and Needs Study for the City of Grand Forks," by Advanced Engineering. The city advised Reclamation that the 100 gpc/d estimate was based on the city's best estimate of conservation. Projections were extended to 2050 by population changes and a straight-line extension of the 2025 to 2040 industrial use.

[7] Industrial projections by the City of East Grand Forks assumed that American Crystal Sugar may expand. Because the company's future business plans are uncertain, and its demands may remain within existing rights, the model retained the current level of water use for this company. Also, the additional "future industries" added to the basin model were assumed to cover some of this potential expansion. Also refer to notes 12 and 13 regarding future industries.

[8] City of Grafton industrial use for 2040 based on a letter from Advanced Engineering dated 1/02/95. It projects increases of 30 percent for Alchem and 35 percent for other users, totaling 432 acre-feet per year. Projections were extended to 2050 by population increases and extension of the 2025 to 2040 industrial use trend.

[9] Drayton industrial use based on city estimates minus a city estimate of 750 million gallons per year "other" use. The main reason for eliminating this level of industrial use was lack of evidence of this use in future city projections.

[10] Moorhead industrial use set based on comments provided by the city to first draft report concerned with this study.

[11] Ground water use set by participant input. Not used in HYDROSS surface water model.

[12] Each projected "future industry" is assumed to represent a total diversion of 6,000 acre-feet per year with 3,000 acre-feet of consumed water.

[13] The type of industry with the greatest growth potential in the Red River Valley is food processing. For modeling purposes, this growth was expressed as four new plants equivalent to the existing Cargill plant, sized for a demand of 6,000 acre-feet per year per plant. These plants were distributed in the Valley based on results of Reclamation's economic analysis. In the model these are designated future industries 2, 3, 4, and 5. (Industry 1 is the existing Cargill plant.)

[14] Projected from the original 2040 demand estimates by a straight-line method accounting for the growth from 2025 to 2040 then extended to the year 2050.

[15] Industrial-use projection based on estimates from Advanced Engineering (letter of 2-9-95) for American Crystal Sugar and a full sized plant for Drayton Grain Processors. Estimates for other projected industries provided by Advanced Engineering were not used, as they were assumed to be adequately covered by the model's placement of a new "future industry" near Drayton.

[16] City of West Fargo's ground water demand held constant from 1994. All future demands assumed to be supplied by surface water.

[17] The city of Moorhead did not derive any of its supply from Lake Ashtabula. Future studies may require a tailoring of the model to better reflect segregation of Moorhead and Fargo shortages and entitlements to the available water in the Red River.

Minnesota Department of Natural Resources

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March 15, 2000

Mr. Dennis E. Breitzman
Bureau of Reclamation
Dakotas Area Office
P.O. Box 1017
Bismarck, North Dakota 58502

RE: Red River Valley Water Needs Assessment, Phase II
Appraisal of Alternatives to Meet Projected Shortages, Draft Report

Dear Mr. Breitzman:

The Minnesota Department of Natural Resources (MNDNR) has reviewed the above-referenced report and we offer the following comments for your consideration. The MNDNR has extensively commented, over many years, regarding the various plans to meet water supply needs in eastern North Dakota. These comments are consistent with our previous correspondence on these issues. Our comments are organized by topic in the order these are presented in the draft report.

6.1 Water Demand and Use Projections

We agree with the conclusion on pages S-23 and 10-2 that the demand projections need to be reassessed. There is an enormous amount of uncertainty in the assumptions (hydrologic and economic) provided in this report and analysis that is not quantified or presented. The projections of growth in industry, in particular, seem to disregard the environmental context of this region--this is dry country with short and often harsh growing seasons. The use of a Bayesian statistical approach, including sensitivity and risk analysis, would show the accuracy of the projections and which variables are driving the results and conclusions. Such an approach should be used in a more detailed analysis of projections. Because of its importance in work of this type, the degree of uncertainty (variability about estimates and their probability of occurrence) associated with an estimate should also be specified. The assumptions at the basis of the projections may overstate water shortages. For example, the projected demands assumed that per capita water use in 2050 will be no greater than it was in 1994, which is the year that water efficient manufacturing standards for plumbing fixtures (1992 Energy Policy Act) went into effect. These manufacturing standards will reduce water requirements and should have been reflected in the projections.

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6.1 We agree that there is considerable uncertainty associated with the demand projections, particularly for new industry. The assumptions and methodologies used in projecting future water demands were presented in Phase I of the Needs Assessment. We believe that these projections are reasonable for an appraisal level of study, and do not represent either the highest or lowest projections that could be made from the existing data.

These projections result in the conclusion on pages S-23 and 10-2 that "if no action is taken to develop additional water supplies, the Red River Valley will experience significant water shortages in the future during drought periods." According to the projections, significant shortages would only occur if the region experienced another "dust bowl" type extreme drought period. During less extreme droughts, such as occurred in 1976, no significant shortages would occur. Figure S-2 shows that during a 1976-type drought, municipal shortages would be almost non-existent, and industrial shortages would be equivalent to the water needs (i.e., 6000 acre-feet) of one of the four projected "Cargill-type" plants. Rural water system shortages are not closely related to water availability. Rural shortages amount to 8000 acre feet regardless of whether it's a dry or wet period and only a "high" population projection is used for the rural water systems demand projections (Table 2.4). The analysis should include demand projections for both the "high" and "low" growth scenarios.

6.2 Future Development Scenarios

There is a growing worldwide awareness that economic sustainability means recognizing the inherent landscape limitations of any given area and developing economic programs based on these limitations. Instead, this study uses some sort of generic concept of human economic development that seems to assume that "what has been" should "always be," without adequate consideration of environment effects and sustainability. The water use forecasts project water use into the future as if there are no inherent environmental limitations. The fact is, there are limitations because of this landscape and climate. These assumptions therefore result in constant shortages, and beg the question of alternatives that do not involve importation of water.

Why should the model assume four more Cargill-type plants (originally the ProGold plant) will develop on the Red River, a river notorious for its low flows during droughts? Of course such an assumption will result in a heavy presumption for the need to import water from another basin. Another approach would assume a model of economic growth that results in plants with heavy water needs constructed around Devil's Lake, a natural water storage site that reliably contains adequate industrial water, even during droughts. We strongly agree with the conclusion on pages S-24 and 10-3 of the study report that "specific locations of major new water users could be optimized for better use of the water resources in the study area" rather than with the development scenarios presented in the report. Given the information presented in Figure S-2, and the uncertainty associated with projected water use (especially industrial use) and alternative development patterns, it seems tenuous to conclude that significant water shortages will occur in the future.

6.3 Need for an Ecosystem Focus

The report does not integrate the economics of people with the economics of the environment.

6.2 Your comment is noted. We believe that the assumptions used for making demand projections are reasonable for this level of study. Future industrial water demands are very difficult to predict. Growth estimates for large food-related processing plants in the study area ranged from 0 to 7 for the period 1994 to 2050. For modeling purposes, we assumed that four new processing plants would be located in the Red River Valley. We disagree with your statement that Devils Lake would reliably contain adequate industrial water during a drought.

6.3 Your comment is noted.

Our comments on your Phase IB report (December 14, 1999) dealt with the parameters necessary for determining flow limits (upper and lower) that would preserve the riverine ecosystem. We presented five main elements of a river system that must be considered (Biology, Water Quality, Geomorphology, Hydrology and Energy Inputs/Pathways), as well as the time element. The approach we outlined for the Instream Flow Needs Assessment is a first step in determining impacts to the natural aquatic ecosystem. To reiterate the main concerns outlined in those comments: the impacts of the 7 action alternatives on the Sheyenne and Red River of the North ecosystems must be assessed using a more comprehensive framework than that which is described in the Phase IB report and in chapter 3 of this Phase II report. While we support the Bureau of Reclamation's stated goal of maintaining the ecological integrity of these river ecosystems, we cannot support the specific conclusion that the aquatic life maintenance seasonal instream flow regime would maintain the ecological integrity of these rivers. Each of the five inter-related components that comprise river systems, discussed in length in our previous comments, must be formally addressed to adequately assess the impacts of the alternative water development projects on these river ecosystems.

People, both current and future generations, are also part of the Red River Valley ecosystem. Providing resources for one segment of society may be at the expense of another segment, in terms of space or time. For example, there may be impacts on people living downstream from a development when water quality, channel erosion or fishing opportunities are degraded. Or water quality degradation may impact future generations' ability to enjoy the same opportunities (economic and recreational) that are currently available. For this reason, the economic impact of affecting the aquatic ecosystem must be accounted for, as this will affect the options and opportunities available to both current and future generations. To adopt an ecosystem perspective, the report needs a regional, coordinated focus on proposed development that includes consideration of all downstream interests likely to be impacted.

6.4 Recreational Economics Assessment

Page 3-15 of the report describes a "recreational economics assessment" which finds that implementing the seasonal instream flow regime would result in no river recreation benefits or regional economic impacts. Without commenting on the merits of the flow regime, we believe that this conclusion is unreliable because it is based on an incomplete analysis of the relationship between an ecologically healthy river system and recreational use. The conclusion implies that there is no need to implement any instream flow regime based on the economics of recreation. We are aware of many studies which support the opposite conclusion. This analysis relies on methodologies developed over 20 years ago, which were based on the probability of undertaking different types of activities at various water depths and velocities. Many of these methodologies were developed for cold water streams in the western U.S. and have been changed with more experience. The data on recreational use was collected only for North Dakota river recreation

6.4 Your comment is noted. The seasonal instream flow regime presented in the report was designed only to maintain the existing aquatic community structure in the Sheyenne and Red Rivers. Therefore, it is not surprising that maintenance of the "status quo" does not produce economic benefits. This conclusion, however, should not be construed to imply that failure to maintain some minimum level of instream flow would not result in economic impacts.

visits, and was done by the North Dakota Parks and Recreation Department. This methodology does not take into account the restoration projects that are being done on the river and on the Minnesota side of the basin, the fact that the catfish fishery in the Red River is world-class, and that the ecological health of the tributaries is highly dependent on what happens on the mainstem. The methods used do not reflect the fact that improvements in the ecological health of the mainstem Red River improves recreation on the tributaries (and vice versa.)

There are many recreational survey methodologies in use. Creel census data collection and analysis methodology has become sophisticated and is very useful as a foundation for an adequate economic analysis. Given the source of the data (Parks and Recreation rather than the North Dakota Game and Fish agency) it is unlikely that these techniques were used. Consequently, we expect that the data collected were irrelevant to the relationship between ecological resource parameters and recreational use and that the conclusion of no impact arose as a result.

6.5 Biota Transfer

The potential for biota transfer by interconnection of the Missouri River and Red River watersheds continues to be a major concern for the MNDNR. We have provided detailed comments on this issue regarding some of the alternatives presented in this report as well as on other related projects. Several of the alternatives which are given serious consideration in this report do not reflect current scientific thinking and would never be acceptable to us. (See attachments.) While the specific impacts from such a transfer in these basins are still unknown, there are many factors that need thorough review and analysis before proposing the technological solution as outlined in Chapter 4.

The report starts with the assumption that water to be transferred "must be pretreated to inactivate aquatic biota, including fish, larvae, fish eggs, algae, viruses, bacteria, and protozoa" (page 4-1). It then proceeds immediately into a technological solution, based on a North Dakota study that has not been reviewed by out-of-state agencies. We believe that before any further work is done on this issue, a thorough risk assessment needs to be done with broad participation and review. This study would include pathways, biota present, a thorough analysis of treatment level achievable, technological feasibility of treatment, and so forth. Such an approach would examine the differences in biota between the basins, the current barriers to biota dispersal, and then conduct a careful exploration of what sorts of new pathways would be created. For instance, a short pipeline, plus a treatment plant with no containment and then discharge into the upper reaches of one of the rivers being studied in North Dakota, greatly shrinks down the distance between bodies of water, and also, because of the new flows, creates new and favorable habitat.

6.5 Some type of treatment would be necessary for any alternative that includes an interbasin transfer of water. Two potential treatment methods are discussed in the report, along with their associated costs. The report does not attempt to evaluate the effectiveness of these or any other biota transfer measures, nor does it assume that the methods presented would meet the requirements of the Boundary Waters Treaty or other applicable laws and regulations.

Biota transfer has the potential for severe environmental and economic damages. There has been increasing world-wide concern among ecological experts regarding the environmental and economic damages caused by the human-caused dispersal of many sorts of organisms. Consequently, there has been a large amount of research in the last few years regarding documentation of damages, development of risk assessment methodologies, and containment techniques, particularly as related to Genetically Modified Organisms (GMO).

Some of the most useful studies regarding general concepts and problems regarding biota transfer have come out of the research on GMO. Portions of the studies pertaining to how organisms are dispersed in the environment and the various containment concepts are directly relevant to proposals to divert Missouri River water to the Red River basin. "The entire set of barriers for the relevant system should achieve the risk management object for the hardest to contain life stage encountered during the course of the project; usually this is the smallest life stage. Because no barrier type is 100% effective at all times, the overall reliability of confinement measures will depend heavily on the number of independent barriers present in series." Containment generally increases in difficulty and decreases in efficacy with 1) decreasing physical size of the organism or its propagules, 2) increasing fitness or physical tolerance of the organism and noting that escape of a single organism can establish populations in a new area, 3) the capacity of the organism or its reproductive propagules to move about and disperse into accessible environments, 4) increasing size and scale of the project, and 5) proximity to environments that greatly facilitate dispersal (e.g., areas of high wind, rivers). ("Manual for assessing ecological and human health effects of genetically engineered organisms, Part One." Scientists' Working Group on Biosafety, Edmonds Institute, Washington, D.C., 1998.)

The section on biota transfer in the report (page 4-1) cites the 1909 Boundary Waters Treaty as requiring pretreatment of water if it is to be transferred from the Missouri River to the Hudson Bay basin. There are many other state and federal laws that would apply to this proposal, and there is no presumption whatsoever that pre-treatment would satisfy all legal and regulatory requirements. In fact, appropriate application of these other laws might result in a finding of infeasibility before one would even begin to study pretreatment as an option. The report includes alternatives that presume a pretreatment technology, without consideration of other limiting factors. Furthermore, the potential extent of economic and environmental damages should a treatment system fail is enormous. Any negative impacts which would occur would be difficult, if not impossible, to remediate.

<u>Water Conservation</u>

We believe that the report should have addressed Feature 12, Increase Water Conservation (5-17ff.), more thoroughly. In general, we believe it is important to concentrate more on reducing

6.6 water use rather than importing water. Large communities in dry climates need very strong water conservation measures, and should promote a general approach to landscaping that emphasizes landscapes and plant species which are tolerant to the lack of water.

The 15 percent overall goal for water conservation is based upon a conservation program which "maintains future residential and commercial water use at their present levels" (page 5-18). The current residential water use is 100-130 gallons per capita per day (gpcd) for cities in the study area, which should allow for reductions in demands by improving water use efficiencies. A study by The American Water Works Association determined that water saving plumbing fixtures and fixing water leaks can reduce in-home water use from 72.5 to 49.6 gpcd (31.6% reduction). The 15 percent goal should be revised to include such a reduction in residential and commercial water use.

In a report titled "Red River Valley Municipal Water Supply Study" (Water Supply Technical Committee, December 1990.), the footnote on page 12 indicates that for some water supply needs the solution is conservation.

> *Based on personal communications with the Mayor of Fargo, it is the Mayor's belief that the City of Fargo could have easily guaranteed the volume of water requested by the French firm* [for a yeast processing plant] *had the City been aware of the firm's inquiry. The study of water supply and demand patterns in Fargo by the Mayor shows that during periods of normal rainfall the volume of water requested is readily available. During dry periods the water could be made available by reducing that used for lawn watering.*

Other factors would further reduce projected water demands. Conservation costs are estimated at 6 to 8 dollars per capita. The design capacity of any water supply system can be reduced by implementing water conservation programs that reduce water demands and improve water use efficiencies. However, the conservation costs in the report do not address cost savings for reducing the size of water treatment or storage facilities and reduced costs for water source development. Impacts on capital and operation costs by reducing projected capacity requirements should also be included. In addition, during drought periods there will be high evaporative losses in the reservoirs, crop failures will result in less irrigation demands and less process water demands, and there will be less water in the Missouri basin available for transfer.

The conservation feature was not used in any of the proposed alternatives based on the justification that the projected demands were average annual values which made no allowance for dry conditions (page 5-18). A new value which represents the average water savings resulting from a more comprehensive conservation program should be developed and included in the

6.6 Water conservation will be an important component of whichever alternative is ultimately selected to meet future water demands in the Red River Valley. Reclamation believes that the water conservation goals described in this report are reasonable for an appraisal-level study. The potential demand reductions that would result from more rigorous conservation programs will be evaluated in the feasibility-level study.

This appraisal study used average annual demands for projecting future water use. As a result, the demands during dry years were underestimated. An analysis of the City of Moorhead demand during the 1988 drought year showed an increase of over 20 percent in per capita water use as compared to the 1985 to 1994 average. We assumed that these increased demands would be offset by an active conservation program. Thus, water conservation was incorporated into all of the alternatives, although it was not specifically modeled. Similarly, cost savings due to water conservation are reflected in the sizing and cost of features such as pipelines and treatment plants.

evaluation of alternatives.

Another related feature that should be considered is the application of a pricing system for water users that utilizes market forces in conjunction with environmental and climatic conditions. Such a feature would require a more detailed focus on alternatives that address a marginal cost system whereby additional water users pay the true capital and operations costs for additional water supply capacity. If this were done, the market would recognize these full costs, and the influence on economic development would favor uses with low water needs or locations where water is available, such as Devil's Lake.

6.7 Drought Contingency Planning

The report is inconsistent in describing the application of drought contingency planning to alternatives. In footnote 1 on page S-17 at the end of table S.8, the statement is made that all alternatives include drought contingency planning. However, on page 5-24 it states that neither of the drought contingency features (13A or B) were considered in any of the alternatives other than Alternative 3. This discrepancy should be cleared up. We believe that all alternatives should include drought contingency features.

In general, integration of conservation and drought contingency features into each alternative will reduce the necessary volumes, infrastructure costs, and impacts from other features within each alternative, thus providing more balance to the current infrastructure-focused alternatives.

6.8 Interbasin Transfer Alternatives

As stated in the Considerations for Future Studies section (pages S-23 and 10-3) there are a wide range of impacts that have not been adequately evaluated and that would result from any of the interbasin transfer alternatives. The Governor of Minnesota and the Commissioner of Natural Resources have both provided extensive correspondence stating their clear opposition to various proposals that would transfer Missouri River water to the Hudson Bay watershed. Examples of the most recent correspondence and testimony before Congress on this issue are attached for your information. We will not reiterate all of the objections to interbasin transfer, which are well supported in this material. However, one point bears repeating.

In Governor Ventura's testimony to Congress on the Dakota Water Resources Act of 1999 (H.R. 2918), which is attached, he recommended that the same standard for review of interbasin transfer issues that is in place for the Great Lakes Basin be applied to the Missouri Basin. We would like to reiterate that position with regard to the further consideration of any water import alternatives in the revision of the Phase II study report. Suffice it to say that the MNDNR remains opposed to any of the alternatives presented in this report which involve interbasin

6.7 The drought contingency features described in chapter 5 were not utilized in the hydrologic modeling for any of the alternatives, including Alternative 3. On page 5-24, the report states incorrectly that Feature 13A (elimination of the minimum pool at Lake Ashtabula) is included in Alternative 3. Features 13A and 13B were reserved for a drought more severe than the 1930's.

6.8 Your comment is noted.

transfers without substantial interstate and international review, consultation and analysis of this issue.

6.9 Alternatives Evaluation

While Tables S.9 and S.10 present an evaluation of expected impacts for the eight alternatives during "the 1930's-style drought" only, this analysis seems over-simplified and tenuous. For example, the text (page S-18) concludes that import alternatives would generally result in increased river flows and reservoir volumes during periods of drought, which would benefit recreation, fisheries and riparian habitats. However, because rivers are hydrologically variable through time, the same volumes which are presumed to benefit fisheries and riparian habitats under drought conditions may disrupt channel stability, increase erosion and sedimentation, and degrade fish and riparian habitat under higher flow conditions, which occur more frequently. To assign benefit based on an incomplete review, using select hydrologic conditions, with no consideration for whole aspects of river systems (e.g., relationships between water quantity, geomorphology, biology), and applying general assumptions of impact (e.g., if a flow condition is beneficial to one species or species life-stage, but harmful to others, is it considered to have a net benefit?) represent an incomplete analysis and may lead to erroneous conclusions.

In Table S.10 (Table 7.1), the evaluation matrix concludes that all interbasin transfer alternatives provide minor to significant improvements for the River Fisheries and Habitat Impacts criteria. While the conclusion that there are natural resources benefits in the Hudson Bay Basin from artificially increasing water volumes is highly suspect, as mentioned above, a corollary to this conclusion is that the interbasin transfer of water will have significant negative impacts on natural resources in the Missouri Basin. The evaluation criteria in Table S-10 must be expanded to include consideration of impacts to the Missouri Basin resources for each alternative.

6.10 Financial Analysis

The report concludes in Chapter 10 that most of the alternatives are "financially viable." While we are uncertain as to the criteria applied to justify this finding, we assume that it means that funding would be available to cover most or all of the costs of the various alternatives based on the proposed Dakota Water Resources Act of 1999, which would increase the construction ceilings for Indian and non-Indian municipal, rural, and industrial water supplies by about $600 million (page S-2). However, we recognize the difference between "financial viability" and "financial justification" in terms of benefit-cost and assume that financially viable alternatives may not be financially justified.

Another conclusion which emerges from the analysis is that the various large infrastructure alternatives appear to be a federal subsidy to support four additional "Cargill-type" plants in the Red River Valley.

6.9 The alternatives analysis presented in the report is preliminary, and is intended to show only the relative magnitude of potential impacts during low flow periods. Since no operating plan has been modeled, it would be difficult to evaluate potential impacts at higher flows. For alternatives that utilize Missouri River water, it should not be assumed that the volumes imported during high flow periods would be similar to the volumes imported during periods of drought.

We agree that potential impacts to the Missouri River basin should be evaluated in future studies. In general, the proportion of Missouri River flows and/or reservoir volumes that would be diverted under the interbasin transfer alternatives would be very small, even during a drought.

6.10 The term "financially viable" does not refer to the amount of federal funding available. Rather, it refers to the ability of project sponsors to repay the federal government for the reimbursable costs associated with the alternatives. It should also be noted that ability to pay does not necessarily infer willingness to pay.

Four additional large agricultural processing plants were included in this study to simulate potential growth in that sector. Most of the federal costs associated with supplying water for new industry would be reimbursable.

6.11 Concluding Comments

Many of the preceding comments have raised issues regarding basic assumptions, level of analysis, and consideration of other factors which, if considered objectively and comprehensively, may eliminate the need for any type of expensive infrastructure for the purpose of meeting water supply needs in the Red River Basin of North Dakota. We encourage you to carefully review the points we have made in this letter and in our previous letters regarding the Phase I Water Needs Assessment.

We recognize that the Findings and Conclusions identify the need for much re-evaluation, reassessment and more detailed analysis. While we agree with that need, we are concerned that the interstate and international consultation and collaboration needed for that further analysis will not be forthcoming. Our repeated requests for communication and meetings needed to begin a coordinated technical-level relationship with the Bureau of Reclamation and North Dakota officials to explore the various Red River Basin water management issues have not resulted in any productive response. Your verbal reply to our comments on the Phase IB report indicated that at the completion of the Phase II report you intend to respond to our earlier offer to meet and begin technical discussions regarding Red River water needs. We reiterate our offer and request that you contact us as soon as possible. The longer that that process is delayed, the more time and money will be spent on studies and analysis that lead to, in our opinion, fundamentally inadequate and misleading conclusions regarding these issues.

Please contact Don Buckhout of my staff (651-296-8212) if you have questions about these comments or would like to schedule a meeting of appropriate representatives from our respective agencies.

Sincerely,

Thomas W. Balcom

Thomas W. Balcom
Environmental Planning and Review Section
Office of Management and Budget Services

c: Kent Lokkesmoe
Lee Pfannmuller
Paul Swenson
Dave Sprynczynatyk

Attachments

6.11 Your comment is noted. Reclamation encourages participation in our planning studies by all interested parties.

CANADIAN SECTION
GARRISON JOINT TECHNICAL COMMITTEE
OFFICE OF THE CHAIRMAN
c/o Transboundary Waters Unit, Environment Canada
300 - 2365 Albert St., Regina, SK Canada S4P 4K1
Tel: 306-780-7004 Fax: 306-780-6810

April 5, 2000

Mr. Dennis Breitzman
Area Manager, Dakotas Area Office
U.S. Bureau of Reclamation
Dakota Area Office
P.O. Box 1017
Bismarck, N.D. 58501

Dear Mr. Breitzman:

Re: Red River Valley Water Needs Assessment Phase II

Thank you for the copy of the January 2000 report entitled *Red River Valley Water Needs Assessment Phase II; Appraisal of Alternatives to Meet Projected Shortages* and the Engineering and Hydrology Appendices. This study has been discussed for sometime at the Canada-U.S. bilateral meetings so we again welcome the opportunity to comment on each phase of it. I have included comments by the Canadian Section of the Joint Technical Committee.

7.1 We understand the report series is being done to help determine the future water demands, and methods to meet these demands, in the Red River Valley, mainly on the North Dakota side of the basin. Because significant and costly decisions could be made as a result of the estimates made in the report series, caution should be exercised in making the estimates of projected use and supply, and in determining the alternatives to meet these projections.

7.2 We have two main concerns about the Phase II report. First, the study did not include the state of Minnesota. This is important given the number of reservoirs in that state which could help address possible water shortages in the Red River Valley. Our second concern is the apparent decision that importation of water from outside the basin is necessary to meet water use projections although in-basin alternatives may be as effective, especially with cooperation with the state of Minnesota and South Dakota, and not present problems associated with interbasin transfers.

Again, thank you for the opportunity to review the report. If you wish further details or clarification about these comments, please contact me.

Yours sincerely,

R L Kellow

R. L. Kellow
Chair, Canadian Section

cc. M. Bach
D. Jewell
Canadian Section, JTC

7.1 Your comment is noted.

7.2 Reclamation agrees that a more basin-wide approach should be used for the next level of study. This report does not identify a preferred alternative. Both in-basin and import alternatives are presented that would meet Reclamation's projected year 2050 shortages. Nothing in the report is intended to infer that importation of Missouri River water is necessary or preferred.

Environment Canada Comments
on the Draft Report - Phase II
Appraisal of Alternative to Meet Projected Shortages
Red River Valley Water Needs Assessment

We have reviewed the report entitled "Red River Valley Water Needs Assessment - Phase II - Appraisal of Alternative to Meet Projected Shortages" by the Bureau of Reclamation of the U.S. Department of Interior dated January 2000 and provided to us on February 11, 2000 including the Engineering and Hydrology Appendices. We make the following general comments and suggestions then provide specific suggestions.

7.3 1. The report appears to be relatively thorough with evaluations given to a variety of scenarios used to meet projected municipal, rural, and industrial water needs to the year 2050. Eight alternatives or scenarios were considered with one being "No Action." Three of the alternatives (as well as no action) do not involve interbasin transfer of water while alternatives 5 - 8 do. This report will be a useful planning document but could have looked at other possible options both for increasing supply and for reducing or forgoing demands. The report has presented the alternatives in a way that makes it easy to compare schemes.

7.4 2. In the section "Considerations for Future Studies", the study period used in the model should have been the period of record, updated to incorporate an additional 15 years of data which included the more recent drought period (1988 - 1992) and wet period (1993 - present). The record should be as long a period as possible, especially for calculating the probability of shortages/ failures and recurrences. The hydrologic and meteorologic data should also have been checked whether the period of record was stationary.

7.5 3. Most of the shortages in the 1931 to 1941 period depended upon the initial storage contents of Lake Ashtabula. The study period should be extended earlier to the previous wet cycle or a more recent drought period used to eliminate the effect of an 'assumed' starting point.

7.6 4. A study of the water supply using the Red River mainstem should have included the state of Minnesota. A comprehensive water supply study for the Red River should not ignore the impact of reservoirs in Minnesota such as Lake Traverse, Lake Orwell, Otter Tail Lake, Agassiz Pool and the Red Lakes. Regulation of the Red Lakes is a critical factor in maintaining instream flows in the Red River at Emerson during drought periods. First nations agreements and the State of Minnesota impose constraints on the lakes, but these lakes could also supply a significant amount of water during a drought. Combining of water supply systems amongst adjacent metropolitan areas (such as West Fargo and Fargo, perhaps extending to Moorhead) could also help reduce shortages.

7.7 5. The report does not comment on the impacts of climate change. Although

7.3. Your comment is noted.

7.4 Your comment is noted. The period of record will be updated for future studies.

7.5 Spring runoff during 1932, the second year in the period of record used for modeling, was sufficient to fill Lake Ashtabula for all alternatives modeled. Therefore, the initial storage of Lake Ashtabula used for modeling had no effect on projected shortages for any year after 1932.

7.6 We agree that future studies should use more of a basin-wide approach. For this study, Fargo, Moorhead, and West Fargo were treated as a single demand point for purposes of modeling the alternatives.

7.7 Assessing the potential effects of climate change was beyond the scope of this appraisal-level study. This could be evaluated in future studies.

knowledge on climate change is imprecise, the study should include a reference to the possibility of changing frequencies/probabilities of droughts and floods, potential changes in land use, etc.

7.8 6. A better evaluation of impacts to water quality would result from increasing the suite of parameters beyond TDS, and to address the wide range of potential effects associated with interbasin transfer of water - not only the social, financial, and political but the environmental concerns.

7.9 7. U.S. Public Law 99-294, referred to as the Garrison Reformulation Act of 1986, states that the "adequate treatment has been provided to meet the requirements of the Boundary Waters Treaty". Pretreatment of water (as noted on page S-12 and elsewhere) to be released into an open system is unlikely to meet the requirements of the Treaty. Disinfection of the water may not coincide with removal of biota in the water.

7.10 8. Reasonable alternatives were proposed which did not raise concerns over transfer of biota and damage to the ecology of the basin. Most of the in-basin solutions minimize ecological risks while remaining financially and technically sound. Because biota transfer is a critical factor in reducing biodiversity and in causing extinctions worldwide and because even water fully treated to current and future drinking water standards is associated with due to system failure, all in-basin options should be explored in greater depth.

7.11 9. The value of 120 gallons (US) of water use per capita per day (gcd) for residential, commercial and public used in the study is higher than values used by many other jurisdictions in the United States, especially for those that have instituted water conservation measures. All residential water use projections for Fargo use a value higher than 120 gcd. Also loss rates appear to be higher for Fargo than other jurisdictions. The high use rate and the high loss rates indicate that a greater gain and reduced shortages would occur from rehabilitation of the system than from expansion.

7.12 10. Flow needs were estimated based on consumption rate of new industries. However new industries could be required to have closed-loop systems, which could not only greatly reduce the amount of water withdrawn, but also eliminate much of the chemical loading in the water system. These closed systems are now more technologically and economically feasible than in the past. Water needs estimates for the industrial sector should be revised taking such considerations into account.

7.13 11. Seeing as the estimates and the choice of methods proposed pretreatment are based on the NAWS proposal, Canada's comments and objections to the NAWS proposal are relevant and valid here. First and foremost, all options involving local and in-basin supplies should be fully explored. In terms of applicable standards, the most current standards and treatment for drinking water must be

7.8 We agree that a large suite of water quality parameters should be evaluated in future studies, and that all of the potential effects of interbasin transfer of water should be evaluated.

7.9 This report does not evaluate the effectiveness of the treatment methods described, and makes no assumptions as to whether or not these methods would meet the requirements of the Boundary Waters Treaty.

7.10 Your comment is noted. The feasibility-level study will evaluate both in-basin and out-of-basin alternatives in greater detail.

7.11 The projected value of 120 gallons per capita per day for residential and commercial water is generally lower than the projected water use elsewhere in the western United States, reflecting a conservative level of water use in the Red River Valley.

7.12 Future industrial demands are difficult to estimate. The size, type, and number of new industries would greatly affect their demand, and the locations of new plants would affect the availability of water. While Reclamation believes that the projections used in this study are reasonable, we believe that more detailed projections for industrial water use should be developed in the feasibility study.

7.13 Your comment is noted. This appraisal-level study relies on existing data, including data generated for the Northwest Area Water Supply (NAWS) proposal. This study makes no assumptions as to whether the biota treatment methods described would meet the requirements of the Boundary Waters Treaty.

applied until standards for biota treatment are developed. Secondly, NAWS is a closed system until final treatment to drinking water standards are achieved. Most Alternatives in Phase II are not closed systems but release water into the environment before full treatment.

7.14 12. The 1989 SWTR is not current and, therefore, should not be the applicable standard: the treatment system must be built to the most recent standard and operations upgraded as new standards evolve. All components of the SWTR need to be applied, not only those clauses related to disinfection: all elements of the treatment must be used in concert to reliably achieve the desired level of protection.

7.15 13. The authors assessed five hydrologically based methods, two hydraulic rating methods, and two habitat preference methods (i.e., Modified Physical Habitat Simulation (PHABSIM), Goal Oriented Method) for making instream flow recommendations. Their objective was to determine which method best maintained the ecological integrity of the Red and Sheyenne River ecosystems (maintaining the existing community structure at a defined level based on the application of hydrologic, hydraulic, and habitat-based methodologies). However two question remain unanswered:

a. What will be the changes in hydrology of the receiving streams, including the Red River, of additional water, including the shape of the hydrograph, annual and season variability, etc.

b. What will the implications be to the native fish and other native aquatic organisms as a result of the changes in hydrology.

7.16 14. All options involving conveyance of water from outside the basin via canal and pipeline raise concerns. A canal gives a number of exposure pathways which increase the risk for biota transfers. Pathways include the open sky design of the waterway and the leakage explicitly accounted for in the flow needs. "Reclamation personnel estimate that any flow directed through the New Rockford would need to be about 15 cfs greater than the intended discharge to the Sheyenne, to allow for seepage, spillage, evaporation and other losses" (page 5-26). "The intake rate is based on a 15 cfs loss in the Rockford canal" (page 6-20). Also the "emergency outlet for storm water discharge" is a potential pathway for biota transfer. (table 6.9 alternative 7A p.6-22 & table 6.11-alternative 7c p. 6-27- alternative 8 p.6-33). These compounded risks would be reduced if water travelling via the Rockford Canal was fully treated, monitored closely and subject to a comprehensive emergency contingency plan.

Some design issues are worthy of mention. The leakage potential of the Rockford Canal makes one wonder if losses of 15 cfs are consistent with the conservation approach featured in every alternative. Perhaps lining the canal, as currently being done in other locations such as California, should be considered

7.14 Your comment is noted.

7.15 Resource agencies and interested groups should meet to discuss and better define instream flow-related objectives and methodologies to answer these questions. Potential changes in the hydrology of the Sheyenne and Red Rivers vary among alternatives, and would also depend to a large degree on how the system is operated. As the feasibility study progresses, additional modeling efforts and additional goal methodology development and verification will provide more refined recommendations. The current set of aquatic maintenance instream flows are not meant to be the definitive answer for ecosystem flows for the Sheyenne River or the Red River of the North.

7.16 Your comment is noted. The New Rockford Canal is located in the James River basin, and therefore seepage from the canal should not be a potential pathway for transfer of biota to the Hudson Bay drainage. The 15 cfs loss in the New Rockford Canal assumes that the canal is fully lined. Our studies indicate that for alternatives utilizing the New Rockford Canal, an emergency outlet to the James River would be necessary to prevent transfer of untreated water to the Hudson Bay drainage during a probable maximum flood event.

to minimize this loss. Also, the need for an outlet should be justified seeing as the capacity for the Rockford Canal is approximately 1000 cfs which should be sufficient to accommodate under 100 cfs required by any of the alternatives and any stormwater needs.

The pipelines suggested are also potential pathways for biota transfer. The risk for leaks through joints or material porosity needs to be detailed in order to adequately evaluate and propose mitigation options. The ease and accuracy of monitoring must be considered and included in the design.

7.17 15. The potential transfer of biota remains the critical factor in the proposed alternatives dependent on imports of water from outside the basin. Ideally, all water transferred from the Missouri to the Red basin should be fully treated to drinking water standards, current to the date operation begins and updated as standards change, before being conveyed across the divide. In particular, concerns arise from proposals where water travels some distance in the Red basin before undergoing any treatment. For instance, feature 14 A, which is included in option 7A, (described on page 5-24), calls for a pipeline from McClusky Canal to New Rockford Canal with a treatment only at the end of New Rockford. Although the report states that the pipeline in 14A stays in the Missouri basin, the water must travel the length of the New Rockford canal before undergoing treatment.

As previously stated, the risk of leaks and overflows is too great to allow untreated water through the canal, therefore it is essential that water be fully treated within the Missouri Basin before entering the Rockford Canal. As for feature 14B, the risk of biota transfer from leaks also raises concerns and make it essential to have both treatment plants.

7.17 Your comment is noted. All import alternatives include treatment before being conveyed across the divide.

Specific Comments:

	Page Number	Comment
7.18	S-16	Why is GDU maintenance costs charged to the Red River water users in the 'No Action' alternative?
7.19	S-16	Alternatives: Was an alternative with water treated to drinking water standards and piped directly into the Fargo area distribution system considered to reduce shortages?
7.20	S-20 & 21 Evaluation Table S.10	Table S-10, Evaluation Matrix for Phase II, "Action " Alternatives was based upon a 1931 - 1941 drought conditions or an expected worst case scenario. Some comments within the report indicate that, although a range of conditions were sometimes modelled, the results of the worst case scenario were usually presented. Table S-10 shows more negative impacts on fish from non-imported water scenarios than for imported water scenarios. These positive and negative impacts in Table S-10 would be mainly expected during a severe drought conditions. However, these positive or negative impacts are more related to physical attributes. The interbasin water transfer evaluations appear to assume very low risk and non-successful interbasin transfer of biota. Consequently, possible impacts due to introduction of foreign species to the Red River watershed did not appear to be considered beyond the assumption that partial treatment will be 100% effective. The effects from the introductions on non-native biota are difficult to determine and qualify, but the concerns are genuine and remain. Introduction of foreign biota could be just as negative to indigenous fishery and other aquatic populations and drought or short-term "no flow" conditions. Therefore some of the weightings are questionable for enhanced flows from interbasin water transfers being more beneficial to current species structures than lower and reduced flows that may occur from within-basin alternatives.
7.21	2-7	Water reuse was included for the Cargill diversion simulations which were the basis for projected demands for four new industries. The report infers that this reuse is fairly minimal. Reuse and recycling are areas that may become more prevalent in the future . What would the difference be to the overall demand estimated for all sectors if reuse or recycling of water within industries was maximized?

7.18 GDU maintenance is included as a cost under "No Action". This cost is not, however, charged to Red River Valley water users.

7.19 A Bismarck to Fargo pipeline was evaluated, but this alternative did not include treatment to drinking water standards for biota control. Full treatment at the source could be evaluated in the feasibility study.

7.20 This report did not evaluate the effectiveness of the biota treatment methods described, and did not preclude the consideration of additional treatment methods in future studies. The potential adverse effects of interbasin transfer of biota were therefore not considered in the evaluation of alternatives. Any alternative that is ultimately selected would have to comply with the Boundary Waters Treaty.

7.21 Additional water reuse by industries would decrease the overall demand. However, since new industries were given a junior water right in the model, industrial reuse would have very little effect on projected shortages in other sectors.

	Page Number	Comment
7.22	2-7	"All in-stream flow points were zeroed in the model...". With the recent emphasis on instream flows and on "healthy rivers" a model study should start with some defined instream flow, and then attempt to meet demands with flows in excess of those instream minimums.
7.23	3-2	What explains the bimodality of the Red River at Fargo study site curve?
7.24	3-4 & 3-5	on page 3-4, the text discusses"...as a means to protect the basic needs of aquatic life in the river..." and on 3-5"... maintaining the existing community structure...". The authors have data to discuss the species and life stages of fish selected for analysis. We feel the report is misleading to imply these flows are protecting the basic needs of aquatic life because only fish have been considered from the aquatic life community. For example, aquatic insects, bivalves and flora should be included.
7.25	3-7	The first sentence suggests that different methods provide different results but further details are not provided. A table comparing the results of the different methods could be provided.

7.22 Your comment is noted. The effects of attempting to maintain minimum instream flows in the Sheyenne and Red Rivers will be evaluated in the feasibility study.

7.23 The bimodality in the plot of percent of maximum weighted usable area for all species of fish during the maintenance period (July through February) versus flow for the Red River at Fargo was caused by one species; sand shiner adult. Weighted usable area peaked twice during the maintenance period and both peaks corresponded to high in-channel (low flow) and overbank (high flow) velocities. See Appendix F of the Phase 1, Part B, Instream Flow Needs Assessment dated August 1999 for additional explanations.

7.24 Your comment is noted. The authors did not intend to mislead the reader. The Phase 1, Part B, Instream Flow Needs Assessment dated August 1999 provided a more complete explanation for using fish as a surrogate for the aquatic community in this appraisal level study. As the feasibility study progresses, a community based assessment could be incorporated into the analysis, as suggested.

7.25 A table comparing the different methods was provided in the Phase 1, Part B Instream Flow Needs Assessment dated August 1999. The text should have cited this reference for the reader.

	Page Number	Comment
7.26	3-8	A constant amount of habitat year-after-year cannot be provided. A different approach may be to provide the optimum weighted usable area (WUA) for respective times of year, such as spawning or maintenance , during high flow years (<1:3), half the optimum during average flow years and 20% of optimum during low flow years (< 1:3 low flows). This approach of varying WUA would better mimic the annual variability of habitat availability. The years of highest fish production tend to coincide with high flow years, therefore optimum habitat conditions should be provided in those years. Also, the instream flow reservation should not be maintained unreasonably high during low flow years to provide a greater amount of habitat than would naturally occur and, perhaps, justify importation of water. In Figure 3.8 (pg. 3-9), the WUA during the maintenance season is greater at a given flow than during the spawning period for the species studied at the Red River at Fargo site. This suggests that less habitat is available during the maintenance period that the spawning period. We suggest that the available habitat should not be limited to 50% of the optimum WUA during the maintenance period when habitat is already in short supply nor listed as a benefit. Comparison with the Platte River that shows similar answers but does not prove that the instream flow recommendations provide sufficient habitat nor that the streams are comparable.
7.27	3-10 Table 3.1	Chapter 3 gives a detailed assessment of instream flow needs, however the computed instream flows are unreasonable high. Minimum instream flows at Emerson of 520 cfs for most of the year, and 3060 cfs during the spring period. To attempt to meet these minimum flows all of the time would mean other uses could not be permitted
7.28	3-12	Nine lines from the top ".. Late May or early **July**..." should this be June?

7.26 As the feasibility study progresses, the intention is to develop a seasonal and water year type flow regime for aquatic life maintenance. For this appraisal level study, the instream flow regime presented is more than adequate for planning purposes.

Figure 3.8 is somewhat misleading. It displays the percent of maximum WUA which is available for all species (50%) or 62% of the average WUA available for all species. Please see Appendix F of the Phase 1, Part B, Instream Flow Needs Assessment dated August 1999 for additional information and explanation. As the study progresses, refinements will be made to the recommended instream flow regime and your comments will be considered.

The intent of the statement regarding the Platte River in Nebraska flows was not to prove anything, but rather was provided as a comparison for a large river with similar geological features and flows.

7.27 The instream flow regime does not represent recommended minimum flows, but those which were developed for aquatic life and riparian corridor maintenance and water quality improvement. The flow regime for Emerson is comparable to that suggested for the Red River at Fargo after taking into consideration drainage area and river size. To attempt to meet these flows would require that other uses not be permitted during some periods.

7.28 The text should have read "...late May through early July...".

	Page Number	Comment
7.29	3-12	Under the second paragraph of 'Water Quality Improvement Opportunities and Needs Assessment'. In the second paragraph, the standards or objectives that the exceedences of boron, chloride and % sodium under low flow conditions were not included nor were the exceedences noted as natural or anthropogenic. Then the report suggested imports to "improve" water quality although flow augmentation should not be considered a beneficial use. The report does not note if the exceedences under low flow rates by these parameters are damaging, of long duration nor if changes in water quality would change the aquatic environment. Imports can not be assumed to be of water with lower concentrations of salts, metals and pollutants.
7.30	3-13	Last paragraph. The last two sentences should be moved into the "Aquatic Life Maintenance Flow Needs Assessment" section. We have difficulty with the proposal to recommend seasonal low flows that are lower than what has occurred historically.
7.31	3-18	On criterion (proposed appropriation in public interest) and sub-criterion (effect on fish and game resources and public recreational opportunities) to be considered by the State Engineer when issuing a permit has been emphasized. It has been emphasized in this context but it is not emphasized in the legislation. The State Engineer has discretion to determine the weight of this sub-criteria with five other sub-criteria (a - f). The legislation mentions that, if the source of water for competing applications is insufficient, the State Engineer must adhere to a priority listing. Fish, wildlife, and other outdoor recreational uses are the lowest priority out of six. With being such a low priority, one might question what the significant negative impacts in Table S.10 really mean. Justification for maintaining or enhancing flows to protect fish may be a means to an end. However, as previously mentioned, possible introductions of out-of-basin biota could be as negatively significant. As commented during the review of the Instream Flow Needs Report Phase I Part B, although a lot of work and money could go into improving and enhancing habitat and recreational opportunities, other allocations may still take precedence.

7.29 This report does not suggest imports to improve water quality. Any water quality improvements that might occur would be considered incidental benefits. Water quality data from Lake Audubon were used to estimate concentrations of constituents in import water.

7.30 The paragraph refers to flow-related recreational use on the Sheyenne River. Period of record seasonal low flows are generally greater in the upper watershed than the lower watershed as are recommended aquatic life and riparian corridor maintenance and water quality improvement flows. The upper watershed is an unregulated watershed whereas the lower watershed is primarily regulated by flow releases from Baldhill Dam and Lake Ashtabula. See Phase 1, Part B, Instream Flow Needs Assessment dated August 1999 for additional information.

7.31 Your comment is noted. Under North Dakota law, appropriation of water requires a diversion. For an import option, a portion of the imported water *could* be appropriated for instream flows. Such an appropriation would not have to compete with other applications that rely on natural flows in the receiving streams.

	Page Number	Comment
7.32	4-1	We disagree that the 1995 Chloramine Challenge study concluded that suspended solids do not affect disinfection power. Also the Northwest Area Water Supply Project (NAWS) is a closed system, with the pretreated water contained within a pipeline until full treatment to the most recent drinking water standards is achieved. The concerns with NAWS relate to pipeline failure and release of pretreated water into the Hudson Bay Drainage before full treatment is achieved. The pretreatment proposed for NAWS cannot be transferred to an open delivery system proposed in Phase II of the Red River Water Needs Assessment.
7.33	4-1	Water quality in the McClusky Canal would presumably be poorer than its source in Lake Audubon and contain higher algal and salt concentrations.
7.34	4-2 & 4-5	The sediment filter backwash will be released to the James River, however the James River is not adjacent to the McClusky Canal and untreated water would have to cross through part of the Hudson Bay drainage before reaching the James River.
7.35	4-	By placing the pretreatment discussion before the discussion of supply alternatives, the report indicates that the importation of water from outside the basin is the preferred option.
7.36	6-28 in alternative 7D 6-33 alternative 8	Dilution is no longer the solution to water pollution. Therefore, water quality objectives should be met by initiatives other than increased flows. The benefits to water quality and water treatment costs should not be used as parameters to estimate the flows needed.
7.37	7-3	Instream flow computations are used only as an impact assessment in Chapter 7. The model study should have a set of defined instream flows, and then attempt to meet demands with flows in excess of those instream minimums.
7.38	7-3	Chapter 7 states that "impacts to the Red River below Fargo have not been determined due to a lack of cross section data in that reach." which indicates this report focuses on the Fargo area and, therefore, the report analysis is incomplete.
7.39	7-14 Figure 7.7	2050 demands show little effects in terms of reduced flows to the Red River at the Canada-U.S. border.

7.32 The 1995 Chloramine Challenge Study concluded that turbidity up to 6.4 NTU did not affect disinfection power. This study does not propose any alternative. Rather, it describes a range of alternatives that includes both pipeline and open conveyance systems.

7.33 Additional studies are needed to determine what the ultimate water quality would be in Lake Audubon and the McClusky Canal should an alternative be selected that utilizes these features to deliver water to the Red River Valley.

7.34 These statements on Figure 4.1 and 4.4 are in error. There is no overflow structure from the McClusky Canal to the James River.

7.35 The report does not identify a preferred alternative, either explicitly or implicitly. The placement of the pretreatment discussion in the report should in no way be construed to indicate that importation of water is preferred.

7.36 Your comment is noted. Reclamation believes that it is reasonable to consider benefits to water treatment cost in the formulation and evaluation of alternatives.

7.37 The effects of attempting to maintain minimum instream flows in the Sheyenne and Red Rivers will be evaluated in the feasibility study.

7.38 Reclamation agrees that the potential negative and positive impacts to the Red River below Fargo should be more thoroughly evaluated.

7.39 Your comment is noted.

	Page Number	Comment
7.40	10-2 2nd to last bullet	Such a comprehensive study should not ignore the impact of reservoirs in Minnesota. To do a water supply study for the Red River, and ignore Lake Traverse, Lake Orwell, and the Red Lakes is surprising at least. Regulation of the Red Lakes is a critical factor in maintaining instream flows in the Red River at Emerson during drought periods. Ignoring these dams makes the information of limited use for indicating potential future flows in the northern portions of the Red River.
7.41	Hydrology Appendix	Pages 235 to 281 inclusive (from Alternative 7C to the References) were missing from our copies of the Hydrology Appendix.
7.42	p. 45-47, Hydrology App.	Was seasonal loss of water due to ice formation included in the estimates for releases from Lake Ashtabula?
7.43	p. 49, Hydrology App.	Although the study assumed 20% in channel loss for releases from Lake Ashtabula, none of the alternatives included a raw water pipeline from Ashtabula to Valley City and/or Fargo/W. Fargo which might reduce in-channel losses and correspondingly eliminate shortages in Valley City and West Fargo and reduce the cumulative 54-yr shortage for Fargo.
7.44	Engineer App.	Table S-8 from Main Report should be reproduced in the Appendix.
7.45	p. 60, Hydrology App.	Only the cities in the Fargo area (Fargo, Moorhead, West Fargo) appear to have significant shortages (in 20% to 30% of the simulation years) for year 2050 using Reclamation Demands.
7.46	p. 4, Engineer App.	The 1995 Challenge indicated that pretreatment provided the specified removal in bench tests, with the 180 minutes of the necessary contact time with chloramines being designed into the residence time in the pipeline. The Challenge study's bench tests showed that turbidity up to 6.4 NTU did not "appear to impact the inactivation". The effects of turbidity due to organic particles were not reported in the Challenge study.
7.47	p. 29, Engineer App.	The annual cost savings for chemicals when compared to Missouri River water are for 2050 demands but costs to transport and treat raw water would begin when construction begins.

7.40 Your comment is noted. The need for a basin-wide approach has been identified.

7.41 We apologize for this printing error.

7.42 Neither ice storage or winter flows needed to keep structures open were considered for this appraisal-level study. These factors could be incorporated into an operational model in the feasibility study.

7.43 Valley City lies immediately downstream of Lake Ashtabula. Essentially no channel losses would be expected in this very short reach. A pipeline from Lake Ashtabula to Fargo was not modeled. The slightly reduced losses would not justify the cost of such a pipeline. Also, such a pipeline would dewater part of the Sheyenne River, causing severe environmental impacts.

7.44 Your comment is noted.

7.45 Your comment is noted.

7.46 Your comment is noted.

7.47 Your comment is noted.

From: "Spading, Kenton E MVP" <Kenton.E.Spading@mvp02.usace.army.mil>
To: "'ghiemenz@gp.usbr.gov'" <ghiemenz@gp.usbr.gov>
Date: 3/6/00 5:09PM
Subject: Corps Comments, Red R. Water Needs

March 6, 2000

To: Greg Hiemenz, US Bureau of Reclamation, Bismarck, ND
From: Ferris Chamberlin P.E. and Kenton Spading P.E., US Army Corps of Engineers, St. Paul, MN, 651-290-5623, kenton.e.spading@usace.army.mil

Subject: Red River Valley Water Needs Assessment Phase II - Draft Report, Review Comments

Thank you for the letter dated 2 Febuary 2000 and the opportunity to review the subject report. The following comments are based on a cursory review.

8.1 Chapter 5, Feature 1, Enlargement of Lake Ashtabula, Description

1. 1st Sentence: Construction of Baldhill Dam began in July of 1947. Because of impending severe flood conditions, the project, while not entirely complete, was placed into emergency operation on 16 April 1950. Permanent operations began in the spring of 1951 and the formal dedication was made on 21 September 1952.

8.2 2. 2nd Sentence: Capacity at elevation 1266.0 feet is 70,600 acre-feet (based on survey performed in mid-80's).

8.3 3. 3rd Sentence: As part of the flood control operation plan, the pool is drawn down prior to spring runoff. Drawdown ranges from elevations 1262.5 feet (minimum drawdown) to 1257.0 feet (maximum drawdown) depending on hydrologic conditions in the basin. Reservoir volume at elevation 1257 feet is 31,000 acre-feet.

8.4 4. 4th Sentence: The Baldhill Dam and Lake Ashtabula Regulation Manual estimates the annual sedimentation rate to be about 150 ac-ft. The survey taken in the mid-80's indicated the loss of storage due to sedimentation was less than previous analysis had predicted. The report states that a loss of about 2,000 ac-ft is expected by the year 2050. While I find no evidence to support this value, without further research or analysis, it appears to be a reasonable value.

8.1 Your comment is noted.

8.2 Elevation and capacity data for Lake Ashtabula used in this study are based on information provided by the Corps of Engineers, and include estimates for future sedimentation. These data will be verified for the feasibility study.

8.3 Your comment is noted. This drawdown was not included in our modeled operations.

8.4 Your comment is noted.

8.5 | 5. 5th Sentence: I assume "Raising the height of Baldhill Dam 16 feet" means "Raising the conservation pool of 1266 ft by 16 ft". Physically raising the embankment would be a major undertaking.

8.6 | 6. Note: Some of the above comments apply to Chapter 5, Feature 13, Description, Page 5-19.

Chapter 6, Alternative 3 - In Basin, Enlarged Lake Ashtabula, Feature 1

8.7 | 7. 2nd Sentence: Existing storage at conservation pool (1266 ft) is 70,600 ac-ft.

8.8 | 8. 3rd Sentence: A storage volume of 120,000 ac-ft corresponds to a pool elevation of 1273.67 ft. A 9-foot rise above above the present conservation pool elevation of 1266 ft would have a storage volume of 130,000 ac-ft.

8.9 | 9. Lake Traverse, Orwell, Homme and Red Lake reservoirs should be mentioned in the report regardless of whether or not they are a contributing factor in regards to water supply needs on the Red River (Homme and Orwell were authorized as water supply reservoirs).

8.10 | 10. Was the report completed by the City of Grand Forks titled "50-Year Water Quanity and Needs Study" considered in this study? (POC Ken Vein, City Engineer 701-746-2630)

8.11 | 11. Any significant changes to the Water Control Plan for Lake Ashtabula would require Congressional approval. While municipal water supply needs have a high priority in emergency situations, requests for releases of water from the reservoir for water supply are at the sole descretion of the Corps of Engineers. The adverse impacts to all the project purposes would have to be evaluated on a case by case basis.

Sincerely,

Kenton Spading, P.E.
Hydrologic Engineer

Ferris Chamberlin, P.E.
Hydraulic Engineer

CC: "Spading, Kenton E MVP" <Kenton.E.Spading@mvp02.usace.army.mil>, "Chamberlin, Ferris W MVP" <Ferris.W.Chamberlin@mvp02.usace.army.mil>

8.5 This feature would include modifications to the embankment and spillway.

8.6 Your comment is noted.

8.7 This statement should reference the estimated year-2050 capacity, not the existing capacity.

8.8 This statement is in error, and should indicate that a 7-foot raise would increase the reservoirs capacity to about 120,000 acre-feet.

8.9 Reclamation agrees that the potential contribution of these lakes to future water supply should be evaluated more thoroughly in the feasibility study.

8.10 Past reports were considered in this study. The city of Grand Forks was represented on the Technical Steering Team for this Needs Assessment.

8.11 Your comment is noted. A feasibility level study, Environmental Impact Statement, and Congressional approval would be required to implement any of the alternatives described in this report.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

MAR 17 2000

RECEIVED

MEMORANDUM

To: Area Manager, Dakotas Area Office
U.S. Bureau of Reclamation, Bismarck

From: Field Supervisor, Ecological Services
Bismarck, North Dakota

Subject: Red River Valley Water Needs Assessment Phase II; Appraisal of Alternatives to Meet Projected Shortages

9.1 We have reviewed the subject appraisal level planning study that has been prepared to develop a range of alternatives to meet future municipal, rural, and industrial water needs in the Red River Valley of North Dakota. The study relied upon existing data to develop alternatives to meet the projected water use in the year 2050. Alternatives include both in-basin and out-of-basin features, water conservation measures, and a variety of management and operational techniques.

This study is an important step, objectively evaluating a wide range of alternatives and their environmental, social, political and economic implications. The information provides a sound basis for beginning a process of narrowing the list of alternatives and preparing a feasibility level study, which will identify a preferred alternative. Given the controversial nature of many options addressed in the appraisal study, this process is particularly important because it provides all interested parties needed information to understand the ongoing planning activities and participate in the decision making process.

As an integral part of the appraisal report, the Bureau of Reclamation and the North Dakota Technical Steering Team have identified a number of issues that will require further study. I support the need to update the modeling information and include the dramatic changes in flows that occurred with the drought conditions from 1988-1992 and the persistent high flows since July 1993. The report also recognizes that a basin-wide approach was not used to complete this effort. I believe future studies need to fully evaluate Minnesota's projected water needs and potential water supply features in Minnesota that could be used to meet the identified needs in the Red River Valley.

In February 1999, the U.S. Army Corps of Engineers completed a scoping document for the Devils Lake Emergency Outlet Environmental Impact Statement. The scoping document

9.1 Your comments are noted.

identifies a number of issues and studies that will be addressed as part of this planning process. Several studies being conducted focus on the Sheyenne River and potential environmental impacts. While the future of this project is uncertain, information addressing resource along the Sheyenne River should be considered as part of the Red River Valley water needs assessment. I am enclosing a copy of the Devils Lake Emergency Outlet Newsletter, October 1998, which briefly summarizes ongoing and completed studies.

Enclosure

cc: Director, ND Game and Fish Dept., Bismarck
(Attn: M. McKenna)